

17

the art without departing from the spirit of the invention. As will be recognized, the invention may be embodied within a form that does not provide all of the features and benefits set forth herein, as some features may be used or practiced separately from others. The scope of the invention is indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed is:

1. An aircraft capable of helicopter and fixed wing flight modes, comprising:

a plurality of wings, each wing having a spar and a flap, the flap being movable with respect to the spar;

a flap actuator configured to move the flap;

a center section rotatably coupled to each spar and including at least one spar actuator and at least one torsionally flexible element coupled to the at least one spar actuator, the spar actuator being configured to rotate at least one of the plurality of wings about a rotational axis of the spar when the aircraft transitions between helicopter and fixed wing flight modes; and

at least one torsion spring configured to apply a pre-pitch moment to the plurality of wings, thereby biasing the plurality of wings to a leading-edge up orientation.

2. The aircraft of claim 1, wherein the torsionally flexible element is a spring.

3. The aircraft of claim 1, wherein the torsion spring comprises a strap pack coupled to the center section.

4. The aircraft of claim 1, wherein the aircraft further comprises:

a closed loop control system comprising a teeter pin and one or more snubber blocks, wherein the control system

18

is configured to control motion of the plurality of wings about a longitudinal axis of the teeter pin.

5. The aircraft of claim 1, wherein an aerodynamic center of each wing is located aft of the rotational axis of the spar.

6. A method for transitioning an aircraft between flight modes, the method comprising:

changing the motion of a center section of the aircraft relative to a fuselage of the aircraft from a first flight mode to a second flight mode, wherein the direction of relative airflow over one of a plurality of wings reverses when the aircraft transitions from the first to the second flight mode;

rotating the one of a plurality of wings such that a leading edge of the wing faces into the new direction of relative airflow; and

changing the orientation of a tail rotor relative to the fuselage, wherein the tail rotor is oriented in a first position when the aircraft is in the first flight mode and oriented in a second position when the aircraft is in the second flight mode, and wherein the first and second positions are different.

7. The method of claim 6, wherein the center section rotates relative to the fuselage in the first flight mode and does not rotate relative to the fuselage in the second flight mode.

8. The method of claim 6, wherein the center section does not rotate relative to the fuselage in the first flight mode and rotates relative to the fuselage in the second flight mode.

9. The method of claim 6 further comprising:

changing the orientation of the tail rotor from the first position to the second position when the aircraft is in either the first or second flight mode.

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